# MAPPING AND GENOMIC TARGETING OF THE MAJOR LEAF SHAPE GENE (*L*) IN UPLAND COTTON (*GOSSYPIUM HIRSUTUM* L.)

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## Abstract

Leaf shape in cotton is an important trait that influences yield, flowering rates, disease resistance, lint trash, and the efficacy of foliar chemical application. The leaves of okra leaf cotton display a significantly enhanced lobing pattern, as well as ectopic outgrowths along the lobe margins when compared with normal leaf cotton. These phenotypes are the hallmark characteristics of mutations in various known modifiers of leaf shape that culminate in the mis/over-expression of Class I *KNOX* genes. To better understand the molecular and genetic processes underlying leaf shape in cotton, a normal leaf accession (PI607650) was crossed to an okra leaf breeding line (NC05AZ21). An $F_2$ population of 236 individuals confirmed the incompletely dominant single gene nature of the okra leaf shape trait in *Gossypium hirsutum* L. Molecular mapping with simple sequence repeat markers localized the leaf shape gene to 5.4 cM interval in the distal region of the short arm of chromosome 15. Orthologous mapping of the closely linked markers with the sequenced diploid D-genome (*Gossypium raimondii*) tentatively resolved the leaf shape locus to a small genomic region. RT-PCR-based expression analysis and candidate gene mapping indicated that the okra leaf shape gene ($L^o$) in cotton might be an upstream regulator of Class I *KNOX* genes. The linked molecular markers and delineated genomic region in the sequenced diploid D-genome will assist in the future high-resolution mapping and map-based cloning of the leaf shape gene in cotton.